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## NOTICE OF ALLOWANCE AND FEE(S) DUE

27885

7590

02/05/2010

FAY SHARPE LLP  
1228 Euclid Avenue, 5th Floor  
The Halle Building  
Cleveland, OH 44115

EXAMINER

THOMPSON, JAMES A.

ART UNIT

PAPER NUMBER

2625

DATE MAILED: 02/05/2010

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/044,468	01/11/2002	Gaurav Sharma	D/A 1160 XER20445	9895

TITLE OF INVENTION: SYSTEM AND METHOD OF HALFTONING FOR MULTI-PASS RENDERING

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1510	\$300	\$0	\$1810	05/05/2010

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. **PROSECUTION ON THE MERITS IS CLOSED.** THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN **THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE** OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. **THIS STATUTORY PERIOD CANNOT BE EXTENDED.** SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

## HOW TO REPLY TO THIS NOTICE:

I. Review the SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

A. If the status is the same, pay the TOTAL FEE(S) DUE shown above.

B. If the status above is to be removed, check box 5b on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

**IMPORTANT REMINDER:** Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

# **PART B - FEE(S) TRANSMITTAL**

**Complete and send this form, together with applicable fee(s), to:** **Mail** **Mail Stop ISSUE FEE**  
**Commissioner for Patents**  
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**INSTRUCTIONS:** This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

27885 7590 02/05/2010

**FAY SHARPE LLP**  
**1228 Euclid Avenue, 5th Floor**  
**The Halle Building**  
**Cleveland, OH 44115**

## **Certificate of Mailing or Transmission**

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/044,468	01/11/2002	Gaurav Sharma	D/A 1160 XER20445	9895

**TITLE OF INVENTION: SYSTEM AND METHOD OF HALFTONING FOR MULTI-PASS RENDERING**

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nonprovisional	NO	\$1510	\$300	\$0	\$1810	05/05/2010

EXAMINER	ART UNIT	CLASS-SUBCLASS
THOMPSON, JAMES A	2625	358-003140

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

- ☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.  
☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. Use of a **Customer Number is required.**

2. For printing on the patent front page, list

- (1) the names of up to 3 registered patent attorneys or agents OR, alternatively, 1  
(2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed. 2  
3

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

(B) RESIDENCE: (CITY AND STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☐ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:

- ☐ Issue Fee  
☐ Publication Fee (No small entity discount permitted)  
☐ Advance Order - # of Copies \_\_\_\_\_

4b. Payment of Fee(s): (Please first reapply any previously paid issue fee shown above)

- ☐ A check is enclosed.  
☐ Payment by credit card. Form PTO-2038 is attached.  
☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number \_\_\_\_\_ (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)

- ☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27. ☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature \_\_\_\_\_ Date \_\_\_\_\_  
Typed or printed name \_\_\_\_\_ Registration No. \_\_\_\_\_

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. **DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.**

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FAY SHARPE LLP 1228 Euclid Avenue, 5th Floor The Halle Building Cleveland, OH 44115			THOMPSON, JAMES A.	
			ART UNIT	PAPER NUMBER
			2625	
DATE MAILED: 02/05/2010				

## Determination of Patent Term Adjustment under 35 U.S.C. 154 (b) (application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 1093 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 1093 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

# Notice of Allowability

## Application No.

10/044,468

## Examiner

James A. Thompson

## Applicant(s)

SHARMA ET AL.

## Art Unit

2625

### - The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 09 November 2009.
2. ☒ The allowed claim(s) is/are 2-4, 7-24, 28-31, 33 and 34.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some\* c) ☐ None of the:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
- (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
- 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
- (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

## Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date \_\_\_\_\_
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date \_\_\_\_\_
7. ☐ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other \_\_\_\_\_.

/James A. Thompson/  
Primary Examiner, Art Unit 2625

**DETAILED ACTION**

***Response to Arguments***

1. Applicant's arguments, see page 11, line 7 to page 12, line 18, filed 09 November 2009, with respect to the rejections of claims 2-4, 7-24 and 32-36 under 35 U.S.C. § 101 have been fully considered and are persuasive. The rejections of claims 2-4, 7-24 and 32-36 under 35 U.S.C. § 101 have been withdrawn. Examiner notes that Applicant's amendments to the claims overcomes the previously applied rejections under 35 U.S.C. § 101.
2. Applicant's arguments, see page 12, line 19-31, filed 09 November 2009, with respect to the rejection of claim 28 under 35 U.S.C. § 112, first paragraph have been fully considered and are persuasive. The rejection of claim 28 under 35 U.S.C. § 112, first paragraph has been withdrawn. Examiner notes that Applicant's amendments to claim 28 overcomes the previous rejection of claim 28 under 35 U.S.C. § 112, first paragraph.
3. Applicant's arguments, see page 13, line 1 to page 14, line 3, filed 09 November 2009, with respect to the rejections of the claims over the prior art have been fully considered and are persuasive. The rejections of claims 2-4, 7-24, 28-31, 33 and 34 over the prior art have been withdrawn. Applicant amended independent claims 4, 15, 20 and 28 to incorporate previously notes allowable subject matter. Therefore, the present claims

are deemed to be allowable over the prior art for the reasons set forth below.

***Allowable Subject Matter***

4. Claims 2-4, 7-24, 28-31, 33 and 34 are allowed.

The following is an examiner's statement of reasons for allowance:

Independent claim 4 recites a method of halftoning an image by an image processing unit halftone generator for multi-pass printing. The method includes generating a stochastic screen pixel turn-on sequence for image pixels from an input image, and partitioning the stochastic screen pixel turn-on sequence, with each partition corresponding to a different pass of a multi-pass printer. The method further includes re-ordering the stochastic screen pixel turn-on sequence to restrict a substantial majority of the pixels turned on to render a tone in the minimum number of passes required to produce the tone in the image. Particularly, the re-ordering step restricts at least one of the pixels in the image highlights turned on for printing to a minimum number of partitions needed for rendering the image highlights and pixels in the image shadows not turned on for printing to a minimum number of partitions needed for rendering the image shadows. Finally, the method includes generating a stochastic halftone

screen using the re-ordered stochastic screen pixel turn-on sequence.

Examiner has not discovered the particularly recited re-ordering step in the prior art, either in a single reference or in an obvious combination of references. The closest prior art discovered are the previously cited prior art references Gotoh (US-2002/0024548), Shiau (US-5,880,857) and Wang (US-6,014,500). However, even in combination, the references do not teach restricting at least one of the pixels in the image highlights turned on for printing to a minimum number of partitions needed for rendering the image highlights and pixels in the image shadows not turned on for printing to a minimum number of partitions needed for rendering the image shadows. Finally, the method includes generating a stochastic halftone screen using the re-ordered stochastic screen pixel turn-on sequence, as required by claim 4. Examiner has not discovered prior art which fully teaches claim 4. Therefore, claim 4 is deemed to be allowable over the prior art.

Claims 2, 3, 7-14, 33 and 34 each ultimately depend from claim 4, and are therefore each deemed to be allowable at least due to their respective dependencies from an allowable claim.

Independent claim 15 recites a method of halftoning an image by an image processing unit halftone generator for multi-pass printing. The method includes providing an input image having a plurality of pixels, and partitioning the input image pixels into

partitions wherein each partition corresponds to a different pass of multi-pass printing. The method further includes processing the input image pixels on a pixel-by-pixel basis using error diffusion halftoning restricting a substantial majority of the pixels turned on to render a tone in the image to the minimum number of passes required to produce the tone restricting at least one of pixels in the image highlights turned on for printing to one of the partitions and pixels in the image shadows not turned on for printing to another one of the partitions including: adding a zero mean bias signal to each input image pixel tone value having a value based on the partition containing the input image pixel, adding an error diffused from previously processed pixels to the input tone value of each input image pixel being processed to achieve a desired pixel value for the pixel, and comparing the desired pixel value of each pixel being processed with a threshold value to turn on or not turn on each pixel for rendering the image.

Examiner has not discovered the particularly recited step of restricting in the prior art, either in a single reference or in an obvious combination of references. The closest prior art discovered is the previously cited prior art references Gotoh, Shiao and Wang. However, even in combination, the references do not teach restricting a substantial majority of the pixels turned on to render a tone in the image to the minimum number of passes required to produce the tone restricting at least one of pixels in the image highlights turned on for printing to one of the



partitions and pixels in the image shadows not turned on for printing to another one of the partitions, as required by claim 15. Examiner has not discovered prior art which fully teaches claim 15. Therefore, claim 15 is deemed to be allowable over the prior art.

Claims 16-19 each ultimately depend from claim 15, and are therefore each deemed to be allowable at least due to their respective dependencies from an allowable claim.

Independent claim 20 recites a method of halftoning an image by an image processing unit halftone generator for multi-pass printing. The method includes providing an input image having a plurality of pixels, and partitioning the input image pixels into partitions wherein each partition corresponds to a different pass of multi-pass printing. The method further includes processing the input image pixels on a pixel-by-pixel basis using error diffusion halftoning restricting a substantial majority of the pixels turned on to render a tone in the image to the minimum number of passes required to produce the tone restricting pixels in the image highlights turned on for printing to one of the partitions and pixels in the image shadows not turned on for printing to another one of the partitions. The processing includes: adding an error diffused from previously processed pixels to the input tone value of each input image pixel being processed to achieve a desired pixel value for the pixel, and comparing the desired pixel value of each pixel being processed

with a threshold value added to a zero mean bias signal to turn on or not turn on each pixel for rendering the image, wherein the zero mean bias signal has a value based on the partition containing the pixel being processed.

Examiner has not discovered the particularly recited processing step in the prior art, either in a single reference or in an obvious combination of references. The closest prior art discovered is the previously cited prior art references Gotoh, Shiau and Wang. However, even in combination, the references do not teach restricting a substantial majority of the pixels turned on to render a tone in the image to the minimum number of passes required to produce the tone restricting pixels in the image highlights turned on for printing to one of the partitions and pixels in the image shadows not turned on for printing to another one of the partitions, as required by claim 20. Examiner has not discovered prior art which fully teaches claim 20. Therefore, claim 20 is deemed to be allowable over the prior art.

Claims 21-24 each ultimately depend from claim 20, and are therefore each deemed to be allowable at least due to their respective dependencies from an allowable claim.

Independent claim 28 recites a halftone generator for halftoning for multi-pass rendering of an image having at least one of pixels forming image highlights and pixels forming image shadows, wherein different pixels are rendered in each pass. The halftone generator comprises means for partitioning an input

image having a plurality of input pixel tone values into a plurality of partitions having pixel tone values wherein each partition corresponds to a different pass of multi-pass printing. Further, the halftone generator comprises means for restricting a substantial majority of the pixels turned on to render a tone to the minimum number of passes required to produce the tone restricting at least one of pixels in the image highlights turned on for printing to one of the partitions and pixels in the image shadows not turned on for printing to another one of the partitions.

Examiner has not discovered the recited means for restricting, either in a single reference or in an obvious combination of references. The closest prior art discovered is the previously cited prior art references Gotoh, Shiau and Wang. However, even in combination, the references do not teach a means for restricting which restricts at least one of pixels in the image highlights turned on for printing to one of the partitions and pixels in the image shadows not turned on for printing to another one of the partitions, as required by claim 28. Examiner has not discovered prior art which fully teaches claim 28. Therefore, claim 28 is deemed to be allowable over the prior art.

Claims 29-31 each ultimately depend from claim 28, and are therefore each deemed to be allowable at least due to their respective dependencies from an allowable claim.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James A. Thompson whose telephone number is (571)272-7441. The examiner can normally be reached on 8:30AM-5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward L. Coles can be reached on 571-272-7402. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/James A Thompson/  
Primary Examiner  
Art Unit 2625

30 January 2010